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(54) **SHEET CONVEYING APPARATUS AND IMAGE FORMING APPARATUS**

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B65H 5/38	(2006.01)
B65H 29/12	(2006.01)
B65H 5/06	(2006.01)
G03G 15/00	(2006.01)

(52) **U.S. Cl.**

CPC ***B65H 5/00*** (2013.01); ***B65H 5/062*** (2013.01); ***B65H 5/38*** (2013.01); ***B65H 29/125*** (2013.01); ***G03G 15/6529*** (2013.01); *B65H 2301/51256* (2013.01); *B65H 2402/545* (2013.01); *B65H 2404/1521* (2013.01); *B65H 2404/611* (2013.01); *B65H 2407/31* (2013.01); *B65H 2601/11* (2013.01); *B65H 2801/06* (2013.01); *G03G 15/6552* (2013.01); *G03G 15/6573* (2013.01); *G03G 15/6576* (2013.01); *G03G 2215/00675* (2013.01)

(58) **Field of Classification Search**

CPC B65H 2601/11; B65H 2301/51256; B65H 2407/31; B65H 29/125; B65H 5/062; B65H 5/38; G03G 15/6529

USPC 271/264, 83, 273; 399/124, 21

See application file for complete search history.

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(57) **ABSTRACT**

A sheet conveying apparatus comprising: a guide portion which guides a sheet; a support portion which rotatably supports the guide portion; a biasing portion which applies a force to the guide portion to be at a closed position with respect to the support portion and is provided to be detachably attachable; and a stopper portion which contacts with the biasing portion to regulate a rotation of the guide portion in a direction that the guide portion opens.

9 Claims, 14 Drawing Sheets

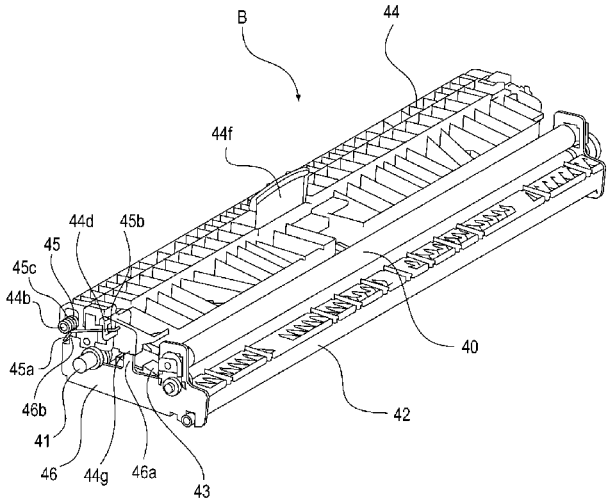
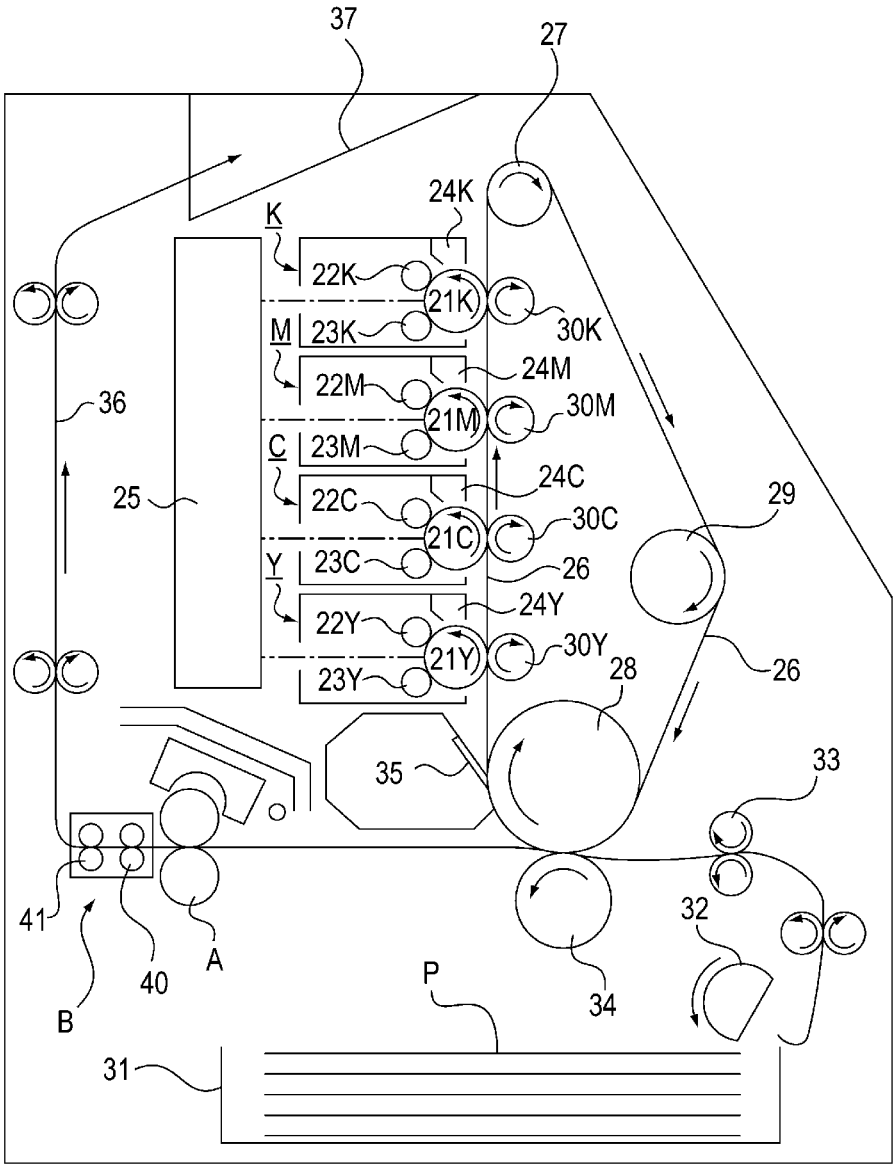


FIG. 1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23C
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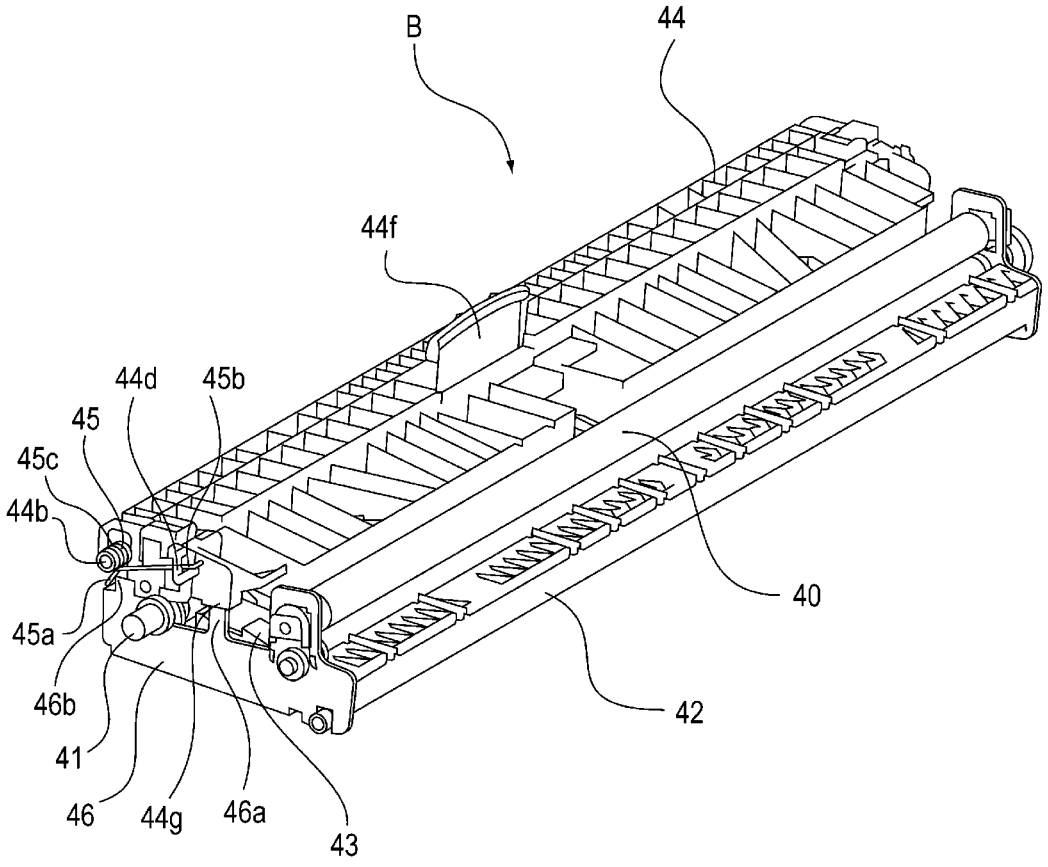
FIG. 2



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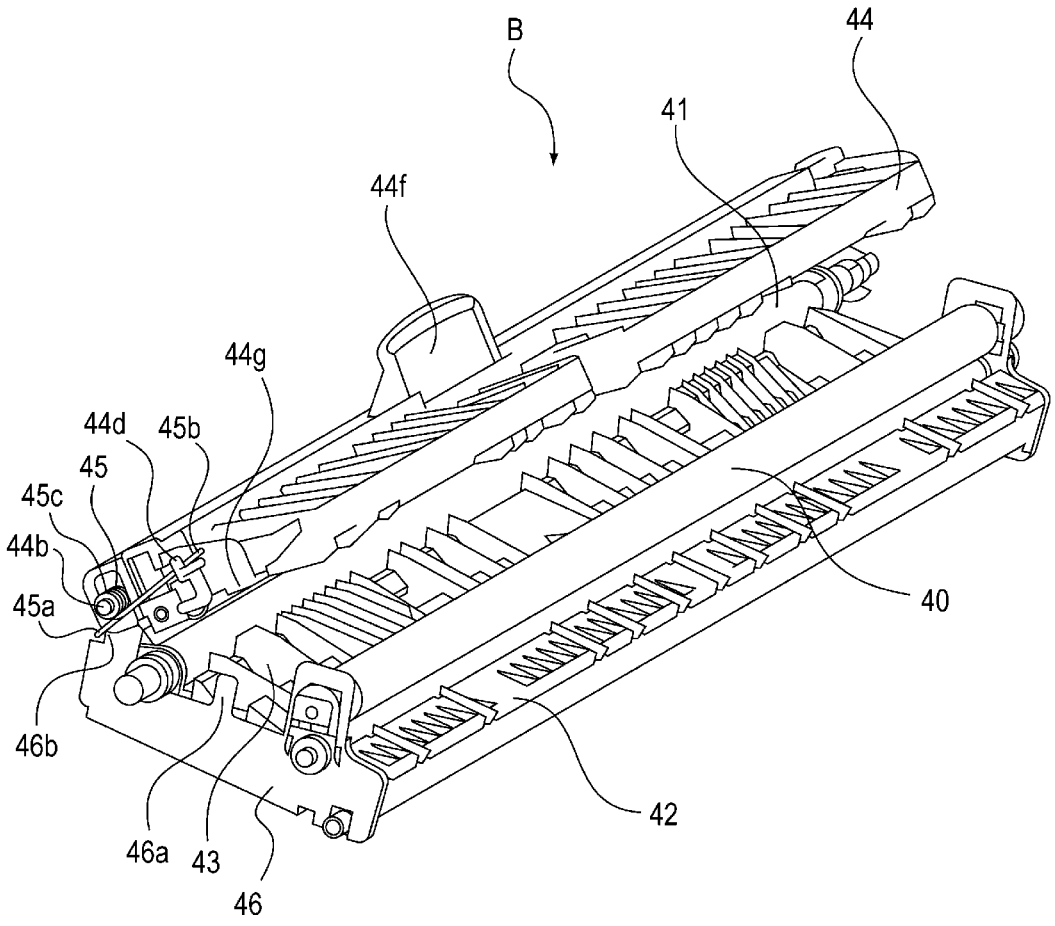

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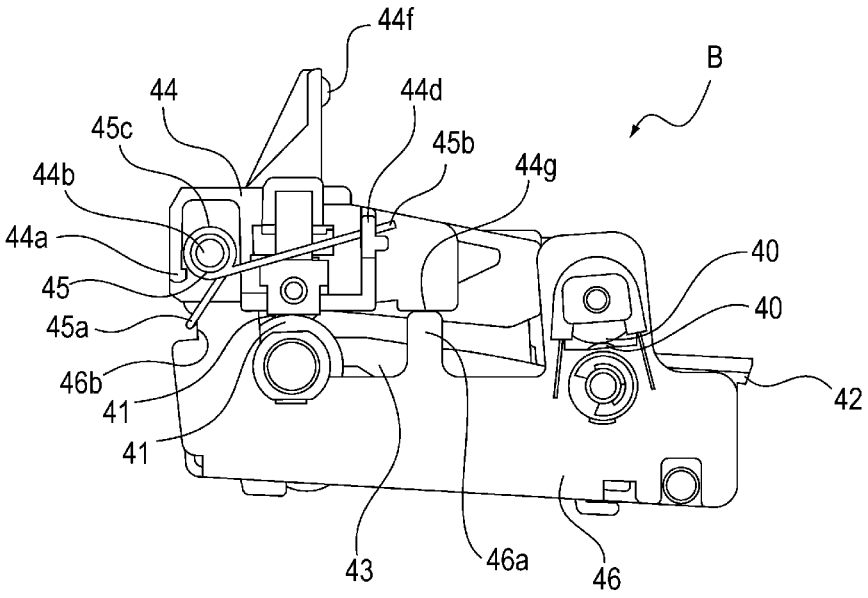

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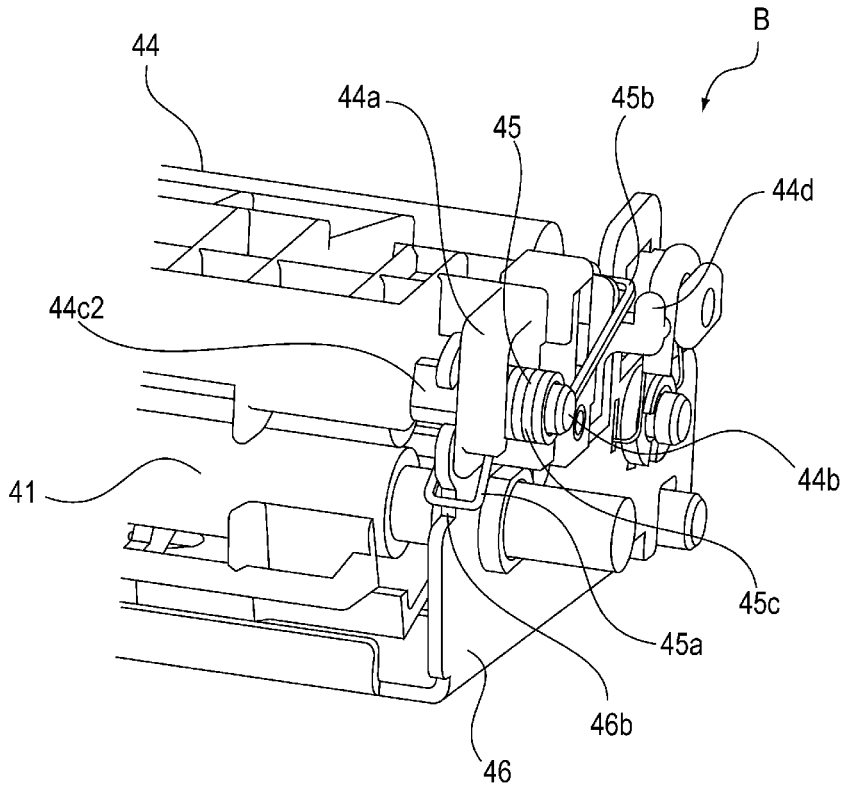

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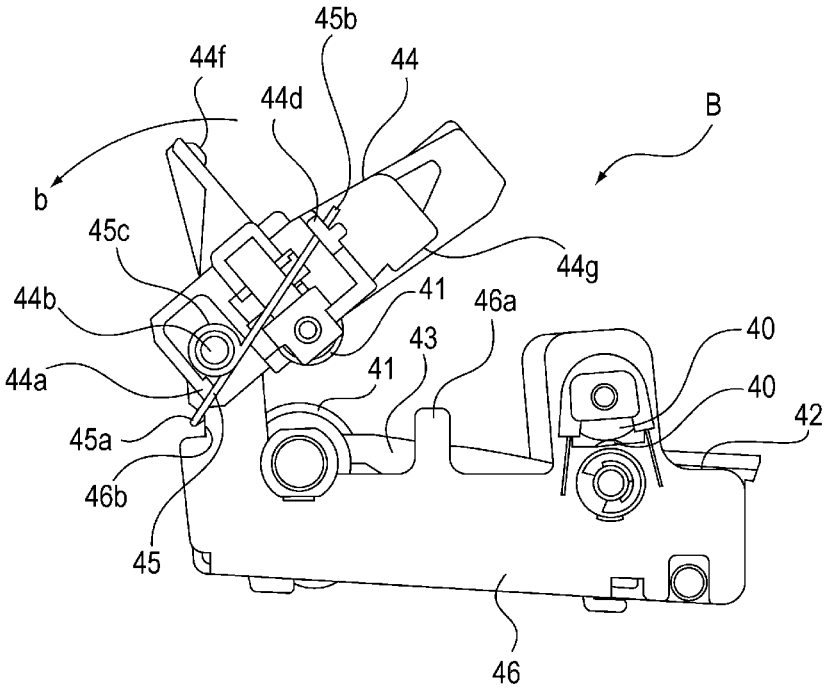
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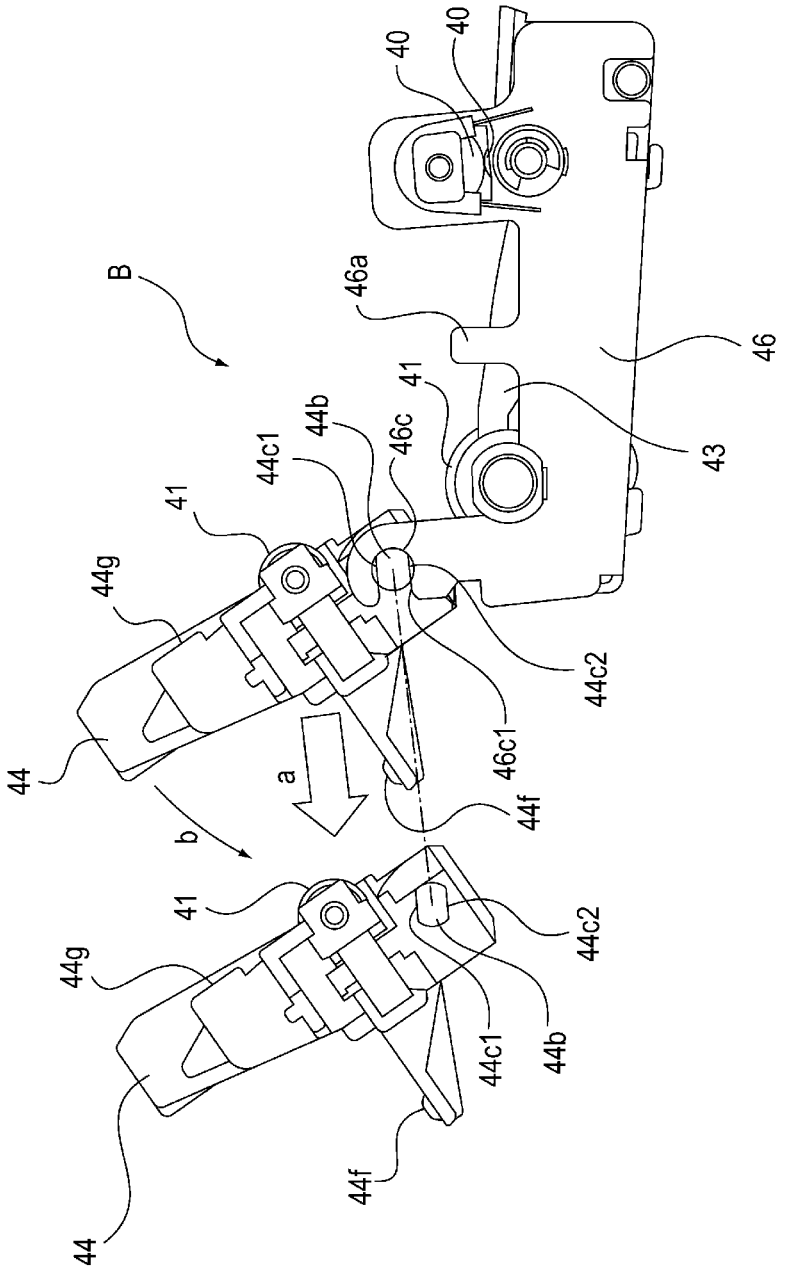
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FIG. 7

FIG. 8

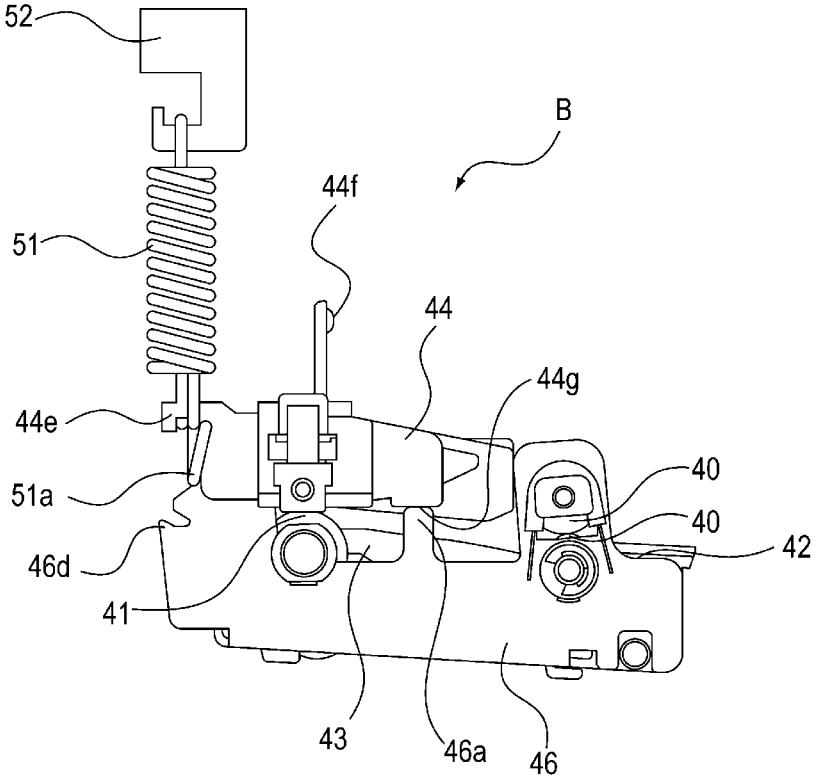
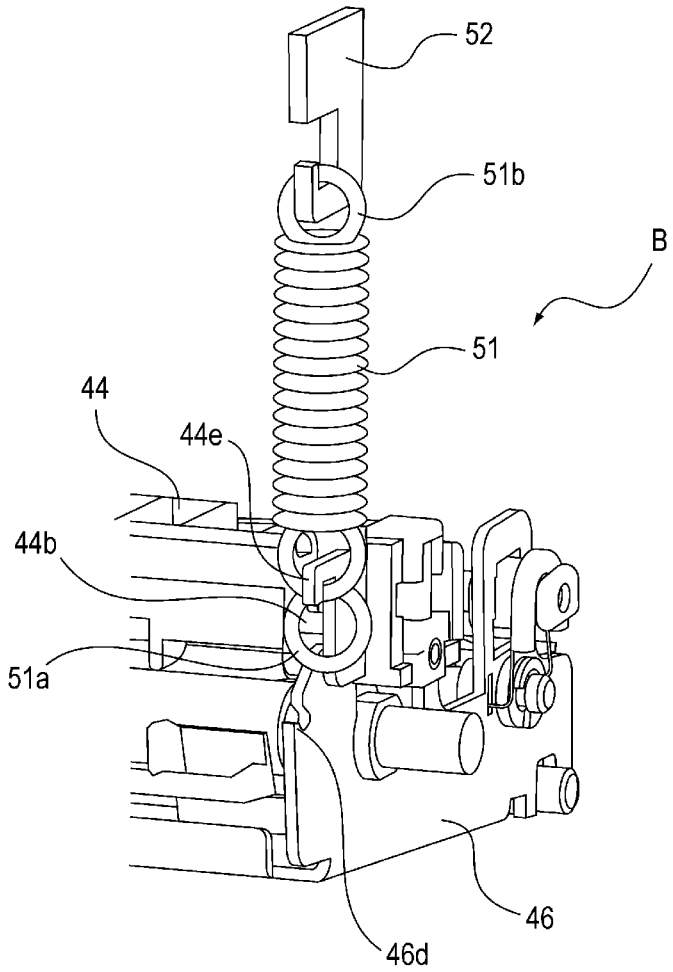


FIG. 9



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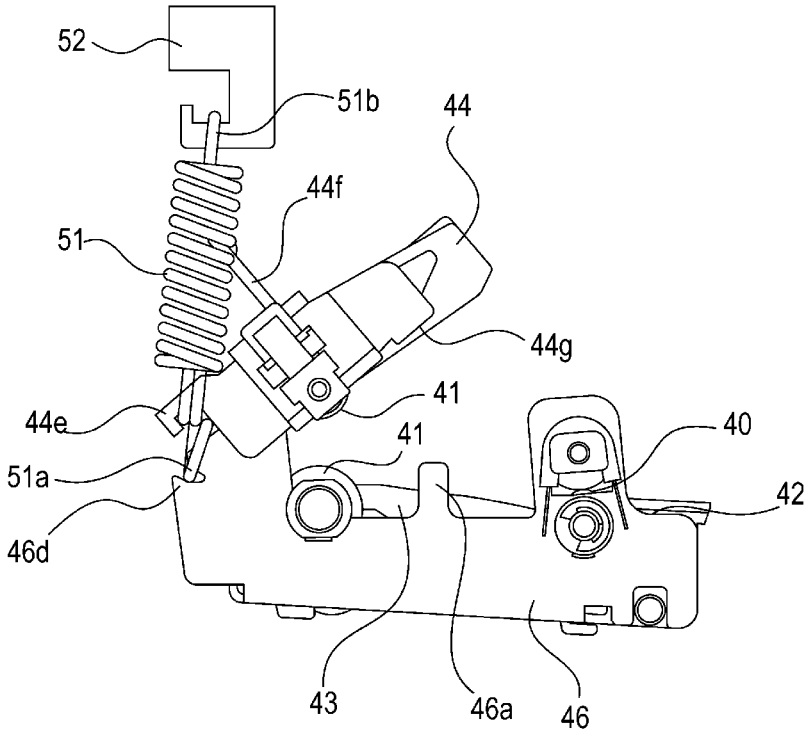

FIG. 11

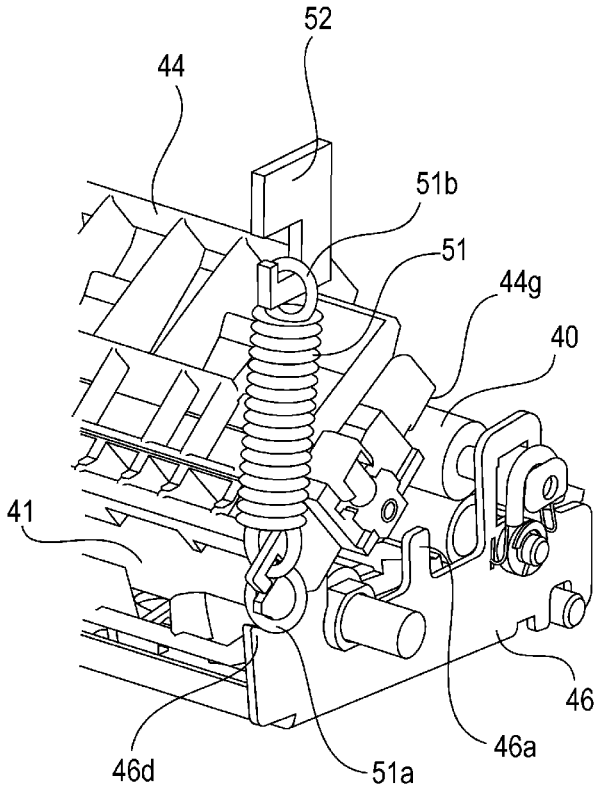

FIG. 12

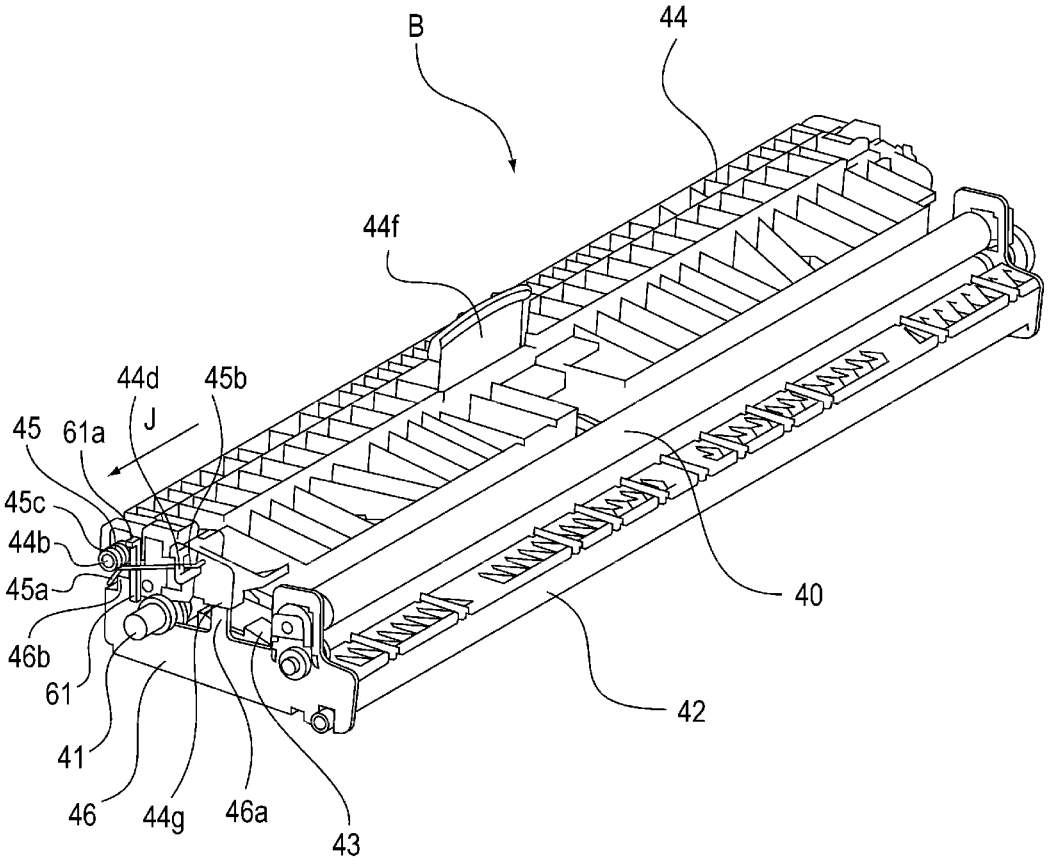

FIG. 13

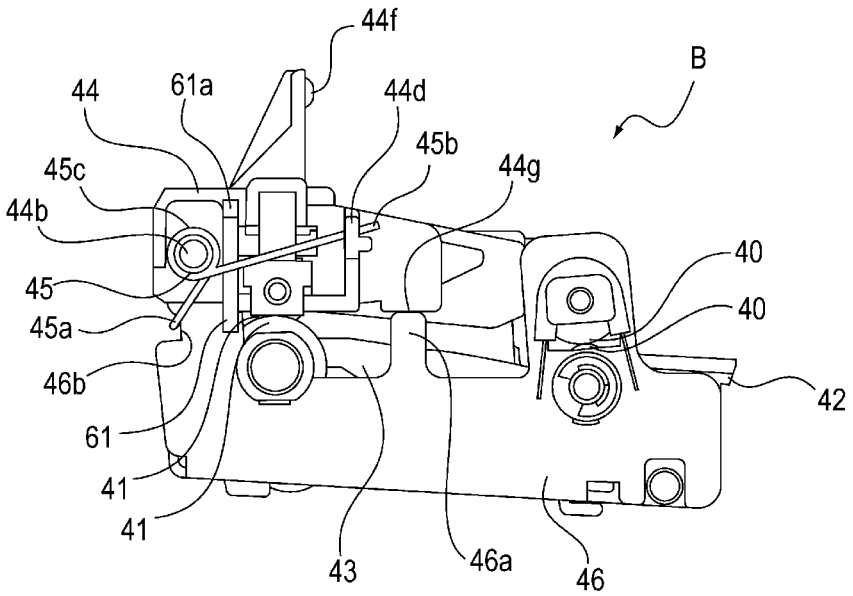
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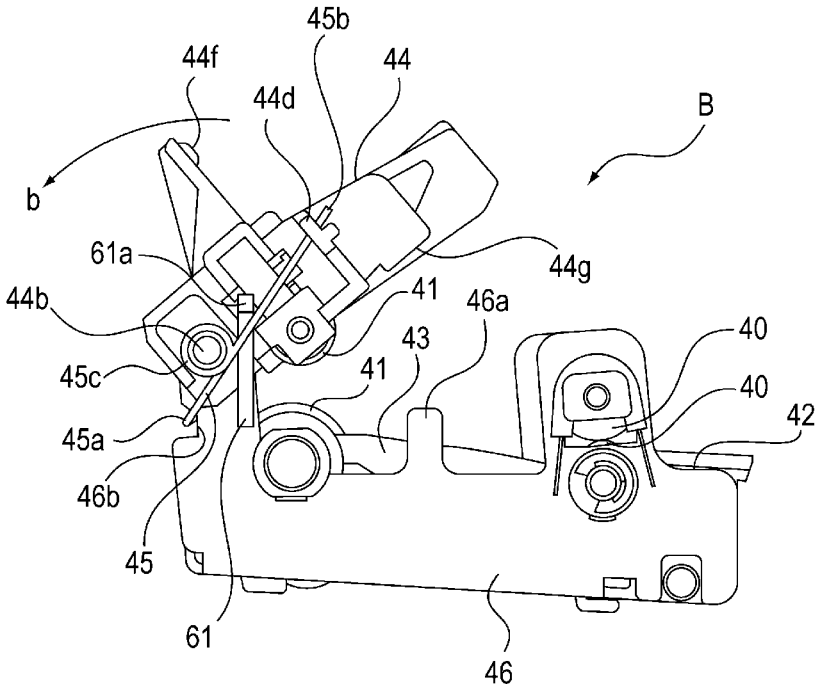
FIG. 14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SHEET CONVEYING APPARATUS AND IMAGE FORMING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a sheet conveying apparatus and an image forming apparatus having the same.

2. Description of the Related Art

In an image forming apparatus represented by a copying machine or a printer, when sheet clogging (jam) occurs, a guide member rotates about a pivot to easily take out a jammed sheet and thus the jammed sheet is easily taken out (see Japanese Patent Laid-Open No. 2005-031216). A force is constantly applied to the guide member to be positioned at a closed position for guiding a sheet by a spring. Here, when the guide member is largely opened at the time of the jam recovery of the sheet, the spring which applies a force to the guide member at the closed position becomes weak by metal fatigue. Therefore, it is difficult to keep the guide member at a position of guiding the sheet, and thus a defect of conveyance of the sheet may occur.

In addition, when a service representative maintains the image forming apparatus, it is necessary to clean toner, paper dust, and wax attached to the guide member, a conveying roller, and a sheet detecting sensor. For this reason, it is desirable that the guide member can be largely opened or can be simply detached.

Accordingly, it is desirable that the amount of rotation of the guide member which conveys a sheet is restricted at the time of jam recovery, and the guide member can rotate by an amount of rotation possible in maintenance or the guide member can be detachable at the time of maintenance.

It is desirable to provide a sheet conveying apparatus in which an amount of rotation of a guide member that conveys a sheet is variable, and it is possible to perform maintenance such as jam recovery of the sheet and cleaning of the guide member without decreasing performance of conveying the sheet.

SUMMARY OF THE INVENTION

According to an aspect of the invention, there is provided a sheet conveying apparatus comprising: a guide portion which guides a sheet; a support portion which rotatably supports the guide portion; a biasing portion which applies a force to the guide portion to be at a closed position with respect to the support portion and is provided to be detachably attachable; and a stopper portion which contacts with the biasing portion to regulate a rotation of the guide portion in a direction that the guide portion opens.

Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a cross-sectional view illustrating an image forming apparatus according to the invention;

FIG. **2** is a perspective view illustrating a state where a guide member is at a closed position with respect to a support member in an image forming apparatus according to a first embodiment of the invention;

FIG. **3** is a perspective view illustrating a state where the guide member is at an open position with respect to the support member in the first embodiment;

FIG. **4** is a side view illustrating a state where the guide member is at the closed position with respect to the support member in the first embodiment;

FIG. **5** is a perspective view illustrating a state where the guide member is at the closed position with respect to the support member in the first embodiment;

FIG. **6** is a side view illustrating a state where the guide member is at the open position with respect to the support member in the first embodiment;

FIG. **7** is a side view illustrating that the guide member is detached from the support member in the first embodiment;

FIG. **8** is a side view illustrating a state where a guide member is at a closed position with respect to a support member in an image forming apparatus according to a second embodiment of the invention;

FIG. **9** is a perspective view illustrating a state where the guide member is at the closed position with respect to the support member in the second embodiment;

FIG. **10** is a side view illustrating a state where the guide member is at the open position with respect to the support member in the second embodiment;

FIG. **11** is a perspective view illustrating a state where the guide member is at the open position with respect to the support member in the second embodiment;

FIG. **12** is a perspective view illustrating a state where a guide member is at a closed position with respect to a support member in an image forming apparatus according to a third embodiment of the invention;

FIG. **13** is a side view illustrating a state where the guide member is at the closed position with respect to the support member in the third embodiment; and

FIG. **14** is a side view illustrating a state where the guide member is at an open position with respect to the support member in the third embodiment.

DESCRIPTION OF THE EMBODIMENTS

An image forming apparatus according to an embodiment of the invention will be described in detail with reference to the drawings.

Embodiment 1

First, a configuration of an image forming apparatus according to a first embodiment of the invention will be described with reference to FIG. **1** to FIG. **7**. In addition, the embodiment is an exemplary embodiment of the invention, and the invention is not limited to such an embodiment.

<Image Forming Apparatus> An image forming apparatus according to an embodiment illustrated in FIG. **1** is an example of a color image forming apparatus using an electrophotographic system.

In FIG. **1**, four image forming portions Y, C, M, and K form toner images of colors of yellow, cyan, magenta and black, and are sequentially arranged upward from a lower portion of FIG. **1**.

The image forming portions Y, C, M, and K include photoreceptor drums **21**Y, **21**C, **21**M, and **21**K that are image bearing members, and charging devices **22**Y, **22**C, **22**M, and **22**K that are charging portions, respectively. In addition, they include development devices **23**Y, **23**C, **23**M, and **23**K that are development portions, and cleaning devices **24**Y, **24**C, **24**M, and **24**K that are cleaning portions, respectively.

In addition, for convenience of description, a photoreceptor drum **21** may be representatively described as the photo-

receptor drums **21**Y, **21**C, **21**M, and **21**K. Components constituting the other image forming unit are also described in such a manner.

A yellow toner is accommodated in the development device **23**Y of the yellow image forming portion Y. A cyan toner is accommodated in the development device **23**C of the cyan image forming portion C. A magenta toner is accommodated in the development device **23**M of the magenta image forming portion M. A black toner is accommodated in the development device **23**K of the black image forming portion K.

A laser exposure device **25** is provided corresponding to four image forming portions Y, C, M, and K. Scanning exposure is performed by laser light corresponding to image information emitted from the laser exposure device **25** to each photoreceptor drum **21**, the surface of which is uniformly charged by the charging device **22**, to form an electrostatic latent image corresponding to a scanning exposure image pattern of each color on the surface of each photoreceptor drum **21**.

The toner of each color is supplied, and the electrostatic latent image formed on the surface of each photoreceptor drum **21** is developed as a toner image by the development device **23** of each color. That is, a yellow toner image is formed on the photoreceptor drum **21**Y of the yellow image forming portion Y. A cyan toner image is formed on the photoreceptor drum **21**C of the cyan image forming portion C. A magenta toner image is formed on the photoreceptor drum **21**M of the magenta image forming portion M. A black toner image is formed on the photoreceptor drum **21**K of the black image forming portion K.

The toner images of each color formed on the photoreceptor drums **21** of the image forming portions Y, C, M, and K are sequentially superimposed and primarily transferred in a predetermined positioning state on an outer peripheral face of an intermediate transfer belt **26** rotating substantially at a uniform velocity, synchronizing the rotation of the photoreceptor drums **21**. Accordingly, a non-fixed full-color toner image is synthesized and formed on the intermediate transfer belt **26**.

The intermediate transfer belt **26** is tensioned by three rollers of a driving roller **27**, a secondary transfer roller counter roller **28**, and a tension roller **29**, and is driven to rotate by the rotation driving of the driving roller **27**.

As a primary transfer portion of the toner image on the intermediate transfer belt **26** from the photoreceptor drums **21** of the image forming portions Y, C, M, and K, a primary transfer roller **30** provided to be opposed to the photoreceptor drums **21** on the inner peripheral face side of the intermediate transfer belt **26** is used. A primary transfer bias voltage having opposite-polarity to a toner is applied to the primary transfer roller **30** by a bias power supply (not illustrated). Accordingly, the toner image is primarily transferred to the intermediate transfer belt **26** from the photoreceptor drums **21** of the image forming portions Y, C, M, and K. After the primary transferring to the intermediate transfer belt **26** from the photoreceptor drums **21** in the image forming portions Y, C, M, and K, the toner remaining on the photoreceptor drum **21** is scrapped and removed by a cleaning device **24**.

The image forming process is performed on each color of yellow, magenta, cyan, and black, synchronizing with the rotation of the intermediate transfer belt **26**. The primary transfer toner images of each color are formed on the intermediate transfer belt **26** in a sequentially superimposed manner. In addition, at the time of only-monochromatic image formation (monochromatic mode), the image forming process is performed only on a desired color.

Meanwhile, a sheet P accommodated in a sheet cassette **31** is continuously fed by a feeding roller **32**, and is separated and fed one-by-one by a separation portion (not illustrated). Thereafter, the sheet P is conveyed to a transfer nip portion formed by the intermediate transfer belt **26** wound on the secondary transfer roller counter roller **28** and a secondary transfer roller **34** at a predetermined timing by a registration roller **33**.

The toner images formed on the outer peripheral face of the intermediate transfer belt **26** are collectively transferred onto the sheet P by the toner applied to the secondary transfer roller **34** by the bias power supply (not illustrated) and a transfer bias voltage having opposite-polarity to the toner. The toner remaining on the outer peripheral face of the intermediate transfer belt **26** after the secondary transferring is scraped and removed by a cleaning device **35**.

The toner image secondarily transferred onto the sheet P is heated and pressurized by a fixing device A that is a fixing portion, and is melted, mixed, and fixed on the sheet P. The toner image is discharged to a discharge tray **37** through an inner discharge conveying portion B and a discharge path **36** of the sheet conveying apparatus, as a full-color print.

<Inner Discharge Conveying Portion> FIG. **2** is a perspective view illustrating a state where an upper conveying guide **44**, which is a guide portion conveying the sheet P, is at a closed position with respect to a support member **46** that rotatably supports the upper conveying guide **44**. FIG. **3** is a perspective view illustrating a state where the upper conveying guide **44** is at an open position with respect to the support member **46**.

As illustrated in FIG. **1**, the inner discharge conveying portion B is disposed immediately after the downstream side in the sheet conveying direction of the fixing device A, and has inner discharge rollers **40** and **41** to suppress curl occurring immediately after the thermally fixing of the sheet P. In the inner discharge rollers **40** and **41**, the face side on which the toner image of the sheet P is formed, is formed of a roller obtained by coating metal rollers with fluorine resin. The non-image face side of the sheet P is formed of a roller obtained by providing a sponge layer on a metal shaft and coating a surface layer with fluorine resin. As described above, the curl amount of the sheet P is suppressed by a difference in thermal conduction of a pair of rollers.

The inner discharge conveying portion B includes a first lower conveying guide **42**, a second lower conveying guide **43**, and the upper conveying guide **44** which guide the sheet P, and each guide is provided with a hole for improving ventilation characteristics to prevent dew condensation caused by moisture generated from the sheet P immediately after the fixing. In addition, each guide is formed of synthetic resin.

The upper conveying guide **44** rotates about a rotation shaft **44***b* that is a rotation center for jam recovery of the sheet P, and can open the upper conveying guide **44** with respect to the first lower conveying guide **42** and the second lower conveying guide **43**.

A fitting portion **45***c* of a torsion coil spring **45** is fitted to the rotation shaft **44***b* that is a shaft portion provided on the upper conveying guide **44**. The torsion coil spring **45** is configured as a biasing portion that applies a force to the upper conveying guide **44** to be at a closed position illustrated in FIG. **2** with respect to the support member **46** as the support portion.

FIG. **4** is a side view illustrating a state where the upper conveying guide **44** is at a closed position with respect to the support member **46**. FIG. **5** is a perspective view illustrating a state where the upper conveying guide **44** is at the closed position with respect to the support member **46**. As illustrated

in FIG. **5**, the fitting portion **45***c* of the torsion coil spring **45** is fitted to be detachably attachable to the rotation shaft **44***b* that is the rotation center of the upper conveying guide **44**. Accordingly, the torsion coil spring **45** is disposed on the same shaft as the rotation shaft **44***b* that is the rotation center of the upper conveying guide **44**.

One end portion **45***a* of the torsion coil spring **45** is locked to be detachably attachable to a spring attaching portion **46***b* provided on the support member **46**, and the other end portion **45***b* is locked to be detachably attachable to a spring attaching portion **44***d* provided on the upper conveying guide **44**.

A force is constantly applied to the upper conveying guide **44** in a clockwise direction of FIG. **4** about the rotation shaft **44***b* by an elastic force of the torsion coil spring **45**. An abutting portion **44***g* provided on the upper conveying guide **44** abuts a stopper portion **46***a* provided on the support member **46**, and thus the upper conveying guide **44** is kept at a guide position illustrated in FIG. **4**.

FIG. **6** is a side view illustrating a state where the upper conveying guide **44** is at the open position with respect to the support member **46**. When the sheet P is jammed in the inner discharge conveying portion B, a knob portion **44***f* provided on the upper conveying guide **44** is press-rotated in the direction of the arrow b of FIG. **6** in the reverse direction to the biasing direction based on the torsion coil spring **45** about the rotation shaft **44***b*, to rotate and open the upper conveying guide **44**.

In the upper conveying guide **44**, a stopper portion **44***a* provided on the upper conveying guide **44** abuts an arm portion between the fitting portion **45***c* of the torsion coil spring **45** and one end portion **45***a*, and thus the rotation of the upper conveying guide **44** in the direction of the arrow b of FIG. **6** is regulated as illustrated in FIG. **6**. The position of the upper conveying guide **44** illustrated in FIG. **6** in which the rotation is regulated by abutting the torsion coil spring **45** to the stopper portion **44***a* is referred to as a first position. The upper conveying guide **44** is not opened in the direction of the arrow b of FIG. **6** more than that. That is, the stopper portion **44***a* provided on the upper conveying guide **44** abuts the arm portion between the fitting portion **45***c* of the torsion coil spring **45** and one end portion **45***a*, to regulate an open angle of the upper conveying guide **44**.

By regulating the rotation in the open direction of the upper conveying guide **44**, it is prevented that the upper conveying guide **44** is largely opened and the user carelessly comes in contact with the inner discharge roller **41**. Accordingly, it is possible to prevent the inner discharge roller **41** from being damaged in advance. In addition, it is possible to prevent that the upper conveying guide **44** is largely opened so that the torsion coil spring **45** becomes weak by metal fatigue.

As illustrated in FIG. **4**, the stopper portion **44***a* provided on the upper conveying guide **44** is disposed to abut a portion between the fitting portion **45***c* of the torsion coil spring **45** and one end portion **45***a* of the torsion coil spring **45**. The fitting portion **45***c* of the torsion coil spring **45** is fitted to the rotation shaft **44***b* of the upper conveying guide **44**. One end portion **45***a* of the torsion coil spring **45** is locked to the spring attaching portion **46***b*. Accordingly, it is possible to compactly configure the sheet conveying apparatus without needing a space only for the stopper portion **44***a*.

FIG. **7** is a side view illustrating that the detachably attachable torsion coil spring **45** is detached and the upper conveying guide **44** is separated from the support member **46**. When cleaning or component changing in the inner discharge conveying portion B is performed, it is necessary to largely open the upper conveying guide **44**.

As illustrated in FIG. **7**, by separating one end portion **45***a* and the other end portion **45***b* of the torsion coil spring **45** from the spring attaching portions **44***d* and **46***b*, the torsion coil spring **45** is detached from the rotation shaft **44***b*. The torsion coil spring **45** hooks one end portion **45***a* and the other end portion **45***b* of the torsion coil spring **45** to be detachably attachable to the spring attaching portion **44***d* of the upper conveying guide **44** and the spring attaching portion **46***b* of the support member **46**, and thus can be easily detached.

When the torsion coil spring **45** is detached, a component which abuts the stopper portion **44***a* provided on the upper conveying guide **44** disappears, and thus the component which regulates the rotation in the open direction of the upper conveying guide **44** disappears. Accordingly, the upper conveying guide **44** can rotate in the direction of the arrow b of FIG. **7** more than the first position illustrated in FIG. **6**. The upper conveying guide **44** can rotate to a second position illustrated in FIG. **7**.

At a fitting portion between the upper conveying guide **44** and the support member **46**, as illustrated in FIG. **7**, flat faces **44***c***1** and **44***c***2** in which two cylindrical faces are chamfered are formed at a part of the rotation shaft **44***b* provided on the upper conveying guide **44**. The chamfered flat faces **44***c***1** and **44***c***2** of the rotation shaft **44***b* are inserted into a bearing portion **46***c*, which is provided in the support member **46** and provided with a notch portion **46***c***1** on one side, from the notch portion **46***c***1**, and the rotation shaft **44***b* is provided to be detachably attachable in the bearing portion **46***c*.

Accordingly, the upper conveying guide **44** is rotated about the rotation shaft **44***b* to the second position illustrated in FIG. **7** in the direction of the arrow b of FIG. **7**. In that state, the position of the chamfered flat faces **44***c***1** and **44***c***2** of the rotation shaft **44***b* is matched with the position of the notch portion **46***c***1**, and the upper conveying guide **44** is moved in the direction of the arrow a of FIG. **7**. Accordingly, it is possible to detach the upper conveying guide **44** from the support member **46** in the direction of the arrow a of FIG. **7**.

The upper conveying guide **44** is rotated in the direction of the arrow b of FIG. **7** about the rotation shaft **44***b* over the first position illustrated in FIG. **6**. Accordingly, the sheet guiding in the inner discharge conveying portion B, the cleaning of the inner discharge rollers **40** and **41**, and the exchanging of the component can be easily performed. In addition, as illustrated in FIG. **7**, by detaching the upper conveying guide **44** from the support member **46**, it is possible to further simplify the sheet guiding in the inner discharge conveying portion B, the cleaning of the inner discharge rollers **40** and **41**, and the exchanging of the component.

Embodiment 2

Next, a configuration of an image forming apparatus according to a second embodiment of the invention will be described with reference to FIG. **8** to FIG. **11**. In addition, the same reference numerals and signs are given to the same configurations as those of the first embodiment, and the description thereof will not be repeated.

<Inner Discharge Conveying Portion> FIG. **8** is a side view illustrating a state where the upper conveying guide **44** is at the closed position with respect to the support member **46** in the embodiment. FIG. **9** is a perspective view illustrating a state where the upper conveying guide **44** is at the closed position with respect to the support member **46** in the embodiment. As illustrated in FIG. **1**, the inner discharge conveying portion B of the sheet conveying apparatus is disposed immediately after the downstream side in the sheet conveying direction of the fixing device A. The inner discharge convey-

ing portion B has the inner discharge rollers **40** and **41** to suppress curl of the sheet P immediately after heat-fixing.

The upper conveying guide **44** is supported by the support member **46** to be rotatable about the rotation shaft **44***b* that is the rotation center for jam recovery of the sheet P.

In the embodiment, a tension spring **51** that is detachably attachable as a biasing portion applying a force to the upper conveying guide **44** to be at a closed position with respect to the support member **46** is provided. One end portion **51***a* of the tension spring **51** is locked to be detachably attachable to a spring attaching portion **44***e* provided on the upper conveying guide **44**. The other end portion **51***b* of the tension spring **51** is locked to be detachably attachable to a spring attaching portion **52** provided in a device frame (not illustrated).

A force is constantly applied to the upper conveying guide **44** in a clockwise direction of FIG. **8** about the rotation shaft **44***b* that is the rotation center by a tensile strength of the tension spring **51**. The abutting portion **44***g* provided on the upper conveying guide **44** abuts the stopper portion **46***a* provided on the support member **46** to be disposed at a guide position illustrated in FIG. **8**.

FIG. **10** is a side view illustrating a state where the upper conveying guide **44** is at the open position with respect to the support member **46** in the embodiment. FIG. **11** is a perspective view illustrating a state where the upper conveying guide **44** is at the open position with respect to the support member **46** in the embodiment.

When the sheet P is jammed in the inner discharge conveying portion B, the knob portion **44***f* provided on the upper conveying guide **44** is press-rotated in a counterclockwise direction of FIG. **10** in the reverse direction to the biasing direction based on the tension spring **51** about the rotation shaft **44***b* that is the rotation center, to open the upper conveying guide **44**.

The support member **46** is provided with a stopper portion **46***d* that contacts one end portion **51***a* of the tension spring **51** to regulate an open angle of the upper conveying guide **44**.

The upper conveying guide **44** is press-rotated in the counterclockwise direction of FIG. **10** about the rotation shaft **44***b* that is the rotation center. At that time, one end portion **51***a* of the tension spring **51** locked to the spring attaching portion **44***e* of the upper conveying guide **44** abuts the stopper portion **46***d* provided on the support member **46** to regulate the open angle of the upper conveying guide **44**.

Accordingly, the rotation of the upper conveying guide **44** is regulated at the position illustrated in FIG. **10**, and is not opened more than that. Hereinafter, the position of the upper conveying guide **44** illustrated in FIG. **10** in which the rotation is regulated by abutting one end portion **51***a* of the tension spring **51** to the stopper portion **46***d* is referred to as the first position. In addition, one end portion **51***a* of the tension spring **51** is detached from the spring attaching portion **44***e* of the upper conveying guide **44**. In addition, the other end portion **51***b* of the tension spring **51** is detached from the spring attaching portion **52** provided in a device frame (not illustrated). The tension spring **51** is detached.

In that state, the component on the upper conveying guide **44** side abutting the stopper portion **46***d* provided on the support member **46** disappears. Accordingly, the regulating of the rotation in the open direction of the upper conveying guide **44** disappears. Accordingly, the upper conveying guide **44** can be rotated in the counterclockwise direction of FIG. **10** over the first position illustrated in FIG. **10**. The other configuration is the same as that of the first embodiment, and it is possible to obtain the same effect.

Embodiment 3

Next, an image forming apparatus according to a third embodiment of the invention will be described with reference to FIG. **12** to FIG. **14**. In addition, the same reference numerals and signs are given to the same configurations as those of the embodiments, and the description thereof will not be repeated.

In the first embodiment, the stopper portion **44***a* to which the torsion coil spring **45** abuts is provided on the upper conveying guide **44**. In this embodiment, a stopper portion **61***a* to which the torsion coil spring **45** abuts is provided on the support member **46**.

FIG. **12** is a perspective view illustrating a state where the upper conveying guide **44** is at the closed position with respect to the support member **46** in the embodiment. FIG. **13** is a side view illustrating a state where the upper conveying guide **44** is at the closed position with respect to the support member **46**. FIG. **14** is a side view illustrating a state where the upper conveying guide **44** is at the open position with respect to the support member **46**.

In the embodiment, an arm portion **61** having the stopper portion **61***a* formed of a protrusion contacting with the torsion coil spring **45** is provided to extend upward to regulate the open angle of the upper conveying guide **44** from the support member **46** on the second lower conveying guide **43** side.

At the upper end portion of the arm portion **61** extending upward from the support member **46**, the stopper portion **61***a* formed of a protrusion protruding in the direction of the arrow J of FIG. **12** is provided. As illustrated in FIG. **14**, when the upper conveying guide **44** is opened, the stopper portion **61***a* abuts a portion between the fitting portion **45***c* and the other end portion **45***b* of the torsion coil spring **45**, to regulate the open angle of the upper conveying guide **44**. The other configuration is the same as that of the first embodiment, and it is possible to obtain the same effect.

While the present invention has been described with reference to exemplary embodiments, it is to be understood that the invention is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all modifications, equivalent structures and functions.

This application claims the benefit of Japanese Patent Application No. 2012-193667, filed Sep. 4, 2012, which is hereby incorporated by reference herein in its entirety.

What is claimed is:

1. A sheet conveying apparatus comprising:

a guide portion which guides a sheet;

a support portion which rotatably supports the guide portion;

a biasing member which applies a force to the guide portion urging the guide portion to rotate towards a closed position with respect to the support portion, the biasing member provided to be detachably attached to the sheet conveying apparatus; and

a stopper portion which comes into contact with the biasing member for stopping a rotation of the guide portion in a direction that the guide portion opens against the force of the biasing member.

2. The sheet conveying apparatus according to claim **1**,

wherein the biasing member is formed of a torsion coil spring which is disposed on a shaft as a rotation center of the guide portion, and

wherein when the guide portion is rotated in the direction that the guide portion opens against a force of the torsion coil spring, the torsion coil spring abuts the stopper portion to stop the rotation of the guide portion.

3. The sheet conveying apparatus according to claim **1**, further comprising:

a shaft portion which is provided on the guide portion and to which a fitting portion of a torsion coil spring is fitted; and

a spring attaching portion which is provided on the support portion and to which an end portion of the torsion coil spring is attached,

wherein the stopper portion is provided on the guide portion, and the stopper portion abuts a portion between the fitting portion fitted to the shaft portion of the torsion coil spring and the end portion of the torsion coil spring attached to the spring attaching portion.

4. The sheet conveying apparatus according to claim **1**, further comprising:

a shaft portion which is provided on the guide portion and to which a fitting portion of a torsion coil spring is fitted; and

a spring attaching portion which is provided on the guide portion and to which an end portion of the torsion coil spring is attached,

wherein the stopper portion is provided on the support portion, and the stopper portion abuts a portion between the fitting portion fitted to the shaft portion of the torsion coil spring and the end portion of the torsion coil spring attached to the spring attaching portion.

5. The sheet conveying apparatus according to claim **1**,

wherein the biasing member is formed of a tension spring, an end portion of which is attached to the guide portion, and

wherein when the guide portion is rotated in the direction that the guide portion opens against a force of the tension spring, the tension spring abuts the stopper portion to regulate the rotation of the guide portion.

6. The sheet conveying apparatus according to claim **1**, further comprising:

a first attaching portion which is provided on the guide portion and on which one end portion of the biasing member is detachably hooked; and

a second attaching portion which is provided on the support portion and on which another end portion of the biasing member is detachably hooked.

7. The sheet conveying apparatus according to claim **1**, wherein the guide portion is detachable from the support portion in a state that the biasing member is detached.

8. An image forming apparatus comprising:

the sheet conveying apparatus according to claim **1**; and

an image forming portion which forms an image on a sheet conveyed by the sheet conveying apparatus.

9. The sheet conveying apparatus according to claim **1**,

wherein the biasing member is a spring and the spring contacts with the stopper portion to regulate the rotation of the guide portion when the guide portion is rotated in the direction that the guide portion opens against the biasing force of the spring.

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